

The Cary Arboretum



of The New York Botanical Garden

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From Sahel to Bangladesh: An Ecologist's Dream

Text and photos by Dr. Gus Tillman

Editor's note:

Dr. Tillman's ecological travels have taken him to many developing countries in the world under several different sponsorships and guidelines.

He is currently in Mexico working on a MAB (Man and Biosphere) project which operates under the auspices of UNESCO (United Nations Education, Scientific and Cultural Organization) to study environmental conditions near a nuclear generating station at Laguna Verde, Vera Cruz.

Before returning to the Arboretum October 20, he will work in Paraguay developing a plan for natural parks near Asuncion.

Every ecologist dreams of an assignment which allows visits to a variety of fascinating ecosystems, such as the desert-like Sahel of Central Africa, the mangrove swamps of West Africa and Bangladesh, the sweeping plains and basins of East Africa, and the arid regions of the Middle East. An assignment to prepare environmental guidelines for world-wide irrigation projects under the joint sponsorship of the U.S. Agency for International Development (USAID) and UNESCO's Man in the Biosphere Programme (MAB) — was to be a fulfillment of such a dream — a dream which covered 20 different countries and a total of 35,274 miles around the world.

After eating one last American hamburger, I arrived March 20, 1980 at the JFK international airport in typical Tillman fashion: 30 kg of luggage, (20 kg of which were books) without passport, visas or airline tickets to return home. Fortunately, after delays, a courier delivered the passport and necessary visas from Washington thirty minutes prior to take-off. With that taken care of, lift off to Dakar, Senegal was at 7:20 p.m.

Morning brought my first bleary-eyed view of the dark continent, which really was not so dark. In fact, Dakar enjoys a light, breezy climate. The country is continually swept by ocean winds, while being surrounded by the semi-arid margins of the

Sahel. Dakar is characterized by clothed Senegalese (in flowing robes) and unclothed European tourists, who line the beautiful beaches. Senegal agriculture requires irrigation to extend the brief rainy season, which occurs in early summer. In spite of the obvious success of small scale irrigation ventures and a long history of large scale irrigation failures, the government of Senegal is planning two massive projects on the Senegal River, eventually to encompass the entire basin at an estimated cost of over five billion dollars.

After a short stop in the Gambia, I spent a delightful week in Sierra Leone. My host and guide was Tony Peterson from Hyde Park, New York, a Peace Corps Volunteer who had been one of my favorite students at Dutchess Community College. Using Tony's quarters in a chief's compound within the interior of Sierra Leone as a home base, we toured the country by car,

bus, truck and ferry, visiting irrigation projects, agricultural fairs, agricultural colleges and research stations. The heavily populated parts of Sierra Leone have plenty of rainfall; in fact, their problem is more one of drainage and water control to prevent water-logging of soils. As in Senegal and other West African countries, the principal cash crops are rice and groundnuts, although each farmer will grow second crops of vegetables or rice for home consumption. Mechanization is not common and most of the labor is done by hand, increasing human contact with water that helps to transmit malaria and schistosomiasis, an intestinal or urinary tract parasitic disease. In some villages in West Africa, the incidence of malaria can be as high as 80% and schistosomiasis may affect up to 90% of the village population. The effects of these diseases

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This "Baïla Hilton" was actually a chief's hut in Baïla, Niger where I spent a night.

From Sahal to Bangladesh: An Ecologist's Dream

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are very severe, especially in young children who are also plagued by malnutrition. Every morning the nutrition problem was reinforced as I sat down to my breakfast of one cup of rice, flavored with either palm oil or chicken curry. The addition of chicken was due to my position as honored guest; the children did not receive any chicken unless some parts remained after the adults ate.

The next major stop was in Niger, in the center of the Sahel. In the mid-seventies, the Sahel had an extended drought which killed over half of the livestock and millions of people in the five Sahelian countries. Niger, Chad and Mali have not yet fully recovered from the devastating drought. The rural people of these countries used to be nomadic tribesmen who followed the seasonal sources of water and forage with their herds of goats, camels and cattle. Increased populations and political pressures have forced many of these tribesmen into sedentary agriculture, trying to squeeze pitifully small crops of millet and sorghum out of the sandy, dry soils. In years of good rainfall (less than 10") small crops are harvested, but in bad years, the crops fail and livestock (the farmer's bank account) must be sold to buy food for the family. Small wells provided by international relief agencies have helped greatly in providing water for small garden plots. The larger irrigation projects along the Niger River have not met project expectations for a variety of reasons.

In Niger, I was fortunate to meet three Peace Corps Volunteers and to spend three days with them in a remote Fulani village (one of the three major tribes in Niger). Bathing at the village well, surrounded by giggling children and women, will always remain a favorite memory as will the clear, starry nights on a mat in front of the chief's hut, listening to the strange Fulani language, so capably translated by the volunteers. Less memorable was the stewy mixture of millet and some unknown meat. I preferred to keep the origin of the meat unknown, since rats are considered to be a valuable protein source.

Beautiful Kenya, after my short visits to Mali and Nigeria, provided a welcome respite from hut living and well bathing. The ultra-modern and beautiful city of Nairobi is geared to a booming tourist trade, with five-star hotels, dramatic skyscrapers and countless travel agencies offering a variety of safari tours. A short visit to the Great Rift Valley and the Masai Mara Game Reserve at the head of the Serengeti Plain were highlights of the trip. Herds of wildebeest, gazelles, and water buffalos are punctuated by wandering



Armed with a 300mm lens, I caught this male lion in the Masai Mara Game Reserve in Kenya.



These Bengali children, and others throughout the trip, seemed to flock around like a fan club wherever I went.

giraffes, baboons, elephants, wart hogs and hyenas. Lions, in prides or as solitary hunters, are commonly viewed, as tourists drive by in their small safari buses. Only the elephants are approached with caution by the tour drivers, and with good reason, for the elephants out-weigh the buses and have notoriously short tempers. Unfortunately, each year the increasing herds of livestock tended by Masai herders encroach a little more on every game reserve. This is aggravated by increasing populations of wildlife, now protected by strict hunting regulations. Certain species, such as the cheetah and rhino, face serious problems due to shrinking range and severe poaching. Cheetah skins and rhino horns are extremely valuable in Asian markets, valuable enough for poachers to continue heavy hunting pressure.

From East Africa, an all-night flight landed me in Switzerland for visits with officials from The World Health Organization, The International Union for the Conservation of Nature and Natural Resources, and The World Wildlife Fund. Switzerland is nice, like a large manicured garden with toy buildings and cars. Airlines and trains operate on schedule and a 45-second delay in departure is enough to cause comments on efficiency. However, I prefer the rough edges of Africa, where schedules are approximations and chickens may be found in the cockpit (no pun intended) of the airliners.

No world irrigation tour would be complete without a visit to Israel, for there one can see irrigation technology at its very best. The Israelis have elevated irrigation efficiency to the very limits through their National Water Carrier System. In addition, Israeli farmers successfully irrigate with water so saline or of such low quality that it would not be used willingly anywhere else in the world. Not restricted by centuries of farming tradition, the Israeli farmers are innovative and push their national irrigation research centers to stay ahead technologically. As a result of the demanding research, environmental problems associated with irrigation are known in advance and systems or strategies are devised to avoid the impacts before the projects begin. This approach is ecologically preferred over the usual one, where unexpected problems cause expensive changes after the projects have been implemented. Environmental guidelines for irrigation are not necessary in Israel.

After Tel-Aviv, short lay-overs in Athens and Bangkok provided welcome diversions, and I could be a tourist for awhile, rather than an ecologist. Next, however, I started a two-week stint in Bangladesh, just at the

beginning of the monsoon season.

In size, about the same area as Wisconsin, Bangladesh is dominated by the confluence of three great river systems, the Ganges-Padma, Brahmaputra and the Meghna. A gradual uplifting of the eastern end of the Indian Plate has shifted the mouth of the Ganges east from Calcutta to a confluence point with the Brahmaputra River in central Bangladesh. The huge delta formed by the three rivers is flooded nearly one-third of the year and limited in agricultural use by salinity for the rest of the year. Yet, over 82 million people live in Bangladesh and the population increases by 2.3 million per year in spite of high death rates from disease, flooding and violent storms during the monsoons.

In Bangladesh, I was working on an assignment for the government of Bangladesh through a grant from The World Bank. Dr. Sam Snedaker and I were to provide an ecological assessment of a regional water resources development plan which included several large irrigation projects. As a part of our assignment, we visited the Sundarban Forest, a mangrove forest near the Indian border and home of the world's largest population of Royal Bengal tigers. In order to return to Dacca, we used a motor launch, a Land Rover, a single boatman ferry, a large public ferry, a public bus (with 250 passengers) and a rickshaw. The trip took two days, and we got close to the real Bangladesh.

Bangladesh is an ecologists' nightmare. It is a country blessed with a moderate climate, with a year-round growing season, extremely fertile alluvial soils, adequate (maybe excessive) water, but with a huge problem... too many people. It is simply not possible to sustain 82 million people, even at poverty levels, in such a small area without massive relief efforts from the industrialized countries. Hence, the feeling of depression when I arrived back in Dutchess County after stops in Bangkok, Hong Kong and San Francisco.

Thus it was a trip of extremes, from hot and dry deserts to moist jungle, from the affluence of Geneva to the poverty of Dacca, from the high technology of Israel to the water-skin irrigation of West Africa and from the noisy bustle of busy cities to the peaceful solitude of beautiful plains and deserts. The full impacts of switching almost daily from luxurious French cuisine in high class hotels or jetliners to unknown stews in grass huts are indescribable, at least at this point in time. Maybe I will sort it all out in Mexico or Paraguay, after all — I have a passport, and I may as well use it.

Researchers "Bug" Rodents to End 40-Year Problem

Research has continued over the summer months in an Ulster County apple orchard to track, monitor and learn the habits of "bugged" pine and meadow voles that have plagued orchardists for over forty years.

The voles, which weigh between thirty and fifty grams (1 to 1 3/4 ounces) each, are responsible for millions of dollars of damage throughout the country's apple orchards. Each year, they destroy seven million dollars' worth of apple trees in Ulster County alone.

A newly-developed program, under the direction of Arboretum Coordinator of Wildlife Resources Jay McAninch, is well underway in a Modena apple orchard located in central Ulster County, where the rodents undergo simple surgery and are "bugged" with small radios implanted within the abdomen.

Weighing no more than one vole-size meal, the tiny transmitters have been successfully implanted in forty voles by scientists in a simple seven-minute operation that puts the rodents back on their feet and in the orchard within hours.

"We believe an understanding of the vole-orchard relationships will lead to cultural management practices that will decrease the desirability of Ulster orchards to voles,"

said Mr. McAninch. "Studies of the voles' behavior and activity patterns will lead to more judicious and effective uses of rodenticides."

Powered by a battery lasting eight weeks, each transmitter is on a separate frequency, allowing researchers to identify and track several voles at a time with a hand-held portable radio and antenna.

Vole reproduction, survival rates, and feeding habits will be evaluated through next year in this intensive study which concentrates on natural management techniques rather than on developing or using new chemical poisons to fight the rising vole population.

"Using chemicals is treating the symptom and not the problem," says Mr. McAninch. The rodents, which feed on the roots of apple trees, can wipe out the entire root-system of a six to eight-year-old tree, leaving the trunk like a stake that can be twisted around in the ground.

In 1971, the most effective vole pesticide, Endrin, was banned in New York State orchards by the Department of Environmental Conservation because of its damaging effects on the environment. In 1977, ten orchardists from Ulster County sought help from the Arboretum on the



*Randy Fitzgerald holds a tiny radio transmitter ready for implantation as Ralph Pagano looks on in their Ulster County research station.
Photo by Robin Parow*

problem and Mr. McAninch proposed his ecological strategy. Funded by the U.S. Fish and Wildlife Service, the \$65,000 project is part of \$410,000 allocated to the state of New York for studying the rodents and conceiving ways to exterminate them from orchards. Nationally, \$1.3 million has been earmarked for the project.

People at the Arboretum



Marcia Davis, Secretary . . . Your first contact with Marcia Davis most likely would be on the telephone when calling the Gifford House to register for a course. Her efficient, courteous manner helps make things go smoothly at the Education and Visitor Center located on Route 44A (Sharon Turnpike). "Working at the Arboretum is like working in a miniature town — complete with a friendly atmosphere and plenty of variety," she says.

Originally from Rhode Island, Marcia and her husband George moved to the Millbrook area from Virginia in 1977. George, who has

a Ph.D. in French, now operates a second-hand and rare book business in Mabbetttsville. "We love this area," says Marcia, adding that they choose to live in Mabbetttsville because it is situated halfway between their families in the Catskills and Rhode Island.

Marcia inquired about a secretarial position at the Arboretum after seeing its surroundings and working environment. "I thought it would be a nice place to work," she says, "and two days later I was hired!" Her duties include registering students for courses, helping to coordinate volunteers, and part-time secretarial work for the Horticulture Department.

To her co-workers, Marcia has a unique personality, bringing smiles and pleasure wherever she happens to be. She reports that the days before major events, such as the Fall-for-All festival, and Recreation and Fitness Day, are always pandemonium. "I don't know how we do it," she says, "but we're always ready just in the nick of time."

At home Marcia enjoys reading "who-dun-it" novels, has two dogs, and in her spare time takes day-trips with her husband to antique shops and yard sales. "But we really consider it a vacation just to live in Mabbetttsville," she says. "We're content to spend our free time at home enjoying the area."



Fall-for-All Slated for October Fifth

The Cary Arboretum's third annual Fall-for-All festival, an event which has attracted thousands of visitors to the Gifford House grounds, is scheduled for October fifth, noon to five p.m.. A raindate is set for October 19.

Autumnal activities will include cider pressing, pumpkin carving, hayrides and apple dunking, as well as winter-preparation demonstrations in quilting, woodlot management, wool spinning and insulated shutter construction.

This year's Fall-for-All festival presents a trend towards country life. Demonstrations in square dancing, wood carving, rug hooking, plant and tree care, and horse supplies and tack will be set-up on the lawn of the Gifford House Education and Visitor Center, Route 44A (Sharon Turnpike) in Millbrook.

Admission is \$1.50 for adults and 75¢ for children and senior citizens. Members of the Arboretum purchasing one adult ticket are entitled to the second one free of charge. For more information, call the Gifford House at (914) 677-5358.

Blueprints, Records Added to Library Collection

"Blueprints for a solar hot water heater, breadbox water heater, biogas plant, and passive solar greenhouse are new arrivals to the Arboretum's circulating library collection, as well as a two-record set entitled *Beautiful Bird Songs of the World*," says Mrs. Betsy Calvin, Arboretum Librarian.

The blueprints and records can be borrowed for a four-week period by Friends of the Arboretum. "Friends" may also be interested in a collection of new books ranging in topics from hiking trails in New York State and home mortgage lending for solar homes to decorating with wildflowers. Please feel free to call or write for a complete list of new accessions.

A pegboard display rack, recently added to the library, now exhibits pamphlets for sale published by the New York State Cooperative Extension Service. These pamphlets include information on beekeeping, strawberry growing, burning wood, solar heating for greenhouses, and more.

Mrs. Calvin urges Friends to take advantage of their memberships by using the Arboretum library as a resource for information on botany, horticulture, alternative energy, wildlife, and ecology. The library is open Monday through Friday, 9 a.m. to noon, 1 to 4 p.m., and evenings by appointment.

Volunteers are needed in the Arboretum's library to assist in filing, to scan newspapers, process books, and to serve as "Acting Librarian" when Mrs. Calvin visits the New York Botanical Garden's Library in the Bronx. The work is important and stimulating, the atmosphere friendly, and volunteer time is always greatly appreciated. If interested, call Mrs. Calvin at (914) 677-5343.

"Down to Earth" Hits Newsstands

News on the local environment, botany, horticulture, alternative energy, and tips from staff members of the Cary Arboretum and the New York Botanical Garden on subjects ranging from woodlot management techniques to planting a perennial garden, can now be found weekly in newspapers published by Taconic Press, Millbrook.

"Down to Earth," a column written by Arboretum Public Relations Specialist Robin Parow, is published in weekly issues of the Millbrook Round Table, the Gazette Advertiser, the Hyde Park Townsman, and the Pine Plains Register Herald. Readers in northeastern Dutchess County and northwestern Connecticut can pick up the column through the Millerton News and the Lakeville Journal, published by Robert Estabrook.

Robert Hebb to U.S.S.R.

Collecting seeds, herbarium specimens and species of birch are the major interests of Arboretum Horticulturist Robert Hebb and two other northeastern United States botanists who will be in the U.S.S.R. through late September under a program sponsored by the U.S. Department of the Interior.

Robert Hebb is currently leading Dr. Fred Seaman, Director of the New York Botanical Garden's Harding Laboratory, and Dr. Richard Weaver, Horticultural Taxonomist at the Arnold Arboretum, on a botanical collecting tour — one paralleled here by two visiting Soviet botanists who collected specimens in the northeastern United States in late July and early August.

Itinerary plans include collecting tours of the Ural Mountains, the North Caucasus Mountains, and numerous sites along the southern regions of the Volga River. Particular collecting emphasis has been placed on sub-alpine and alpine plants.

Prints by Carole Reichgut-Wolf on Display in PSB

Carole Reichgut-Wolf is an acclaimed printmaker who brings twenty years of artistic creativity to the Arboretum in an exhibit which opens with a gallery reception Sunday, September 7, 1:30 to 4:30 p.m. in the Arboretum's Plant Science Building.

A resident of Hyde Park, Ms. Wolf combines drawing, painting and sculptural skills in producing her etchings which emphasize the use of line, texture, brush strokes, tones and deeply bitten areas.

As an art educator, Ms. Wolf teaches at Dutchess Community College, Barrett House, and will teach an up-coming printmaking course for children at the

Arboretum's Gifford House this autumn. She is represented by the Seaman Studio Gallery, Poughkeepsie; Bonfoey on the Square in Cleveland, Ohio; and Caravan House Galleries in New York City.

Her exhibit at the Arboretum, which will run through November, consists of twenty intaglio prints which include etchings, collagraphs and monotypes — the latter of which she calls "Transformations: A World Within a World."

Visiting hours to the exhibit are weekdays, 9 a.m. to 4 p.m., and Sundays, 1:30 to 3:30 p.m. For more information, please call (914) 677-5343.

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